**IGCSE (9–1) Maths - practice paper 1H mark scheme**

**Results Plus data on 83 of the 100 marks:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Paper 1** |  |  |  |  | **Edexcel averages:** |  |  |  |  |  |
| **Year** | **Paper** | **Qu. no** | **New qu. no.** | **Mean score** | **Max score** | **Mean %** |  | **ALL** | **A\*** | **A** | **B** | **C** | **D** | **E** |
| 1706 | 3H | Q01d | Q01 | 1.85 | 2 | 92.5 |  | 1.85 | 1.98 | 1.94 | 1.84 | 1.52 | 0.93 | 0.28 |
| SAMs | 2H | Q03 | Q02 |  | 4 |  |  |  |  |  |  |  |  |  |
| 1706 | 3H | Q04 | Q03 | 4.24 | 5 | 84.8 |  | 4.24 | 4.85 | 4.52 | 3.94 | 2.90 | 1.38 | 0.34 |
| 1706 | 4H | Q05b | Q04 | 2.06 | 3 | 68.7 |  | 2.06 | 2.83 | 2.26 | 1.53 | 0.71 | 0.15 | 0.00 |
| 1706 | 3H | Q07 | Q05 | 2.45 | 3 | 81.7 |  | 2.45 | 2.90 | 2.71 | 2.23 | 1.30 | 0.39 | 0.05 |
| 1706 | 3H | Q08 | Q06 | 4.40 | 6 | 73.3 |  | 4.40 | 5.58 | 4.54 | 3.46 | 2.52 | 1.54 | 0.80 |
| 1701 | 3H | Q07 | Q07 | 2.27 | 3 | 75.7 |  | 2.27 | 2.88 | 2.70 | 2.45 | 1.96 | 1.36 | 0.60 |
| 1706 | 3H | Q09 | Q08 | 1.25 | 2 | 62.5 |  | 1.25 | 1.72 | 1.29 | 0.88 | 0.53 | 0.22 | 0.11 |
| 1706 | 3H | Q10 | Q09 | 3.28 | 4 | 82.0 |  | 3.28 | 3.93 | 3.63 | 2.95 | 1.67 | 0.62 | 0.14 |
| 1706 | 4HR | Q11 | Q10 | 2.40 | 3 | 80.0 |  | 2.40 | 2.91 | 2.69 | 2.26 | 1.62 | 0.82 | 0.44 |
| 1706 | 3H | Q11 | Q11 | 5.87 | 7 | 83.9 |  | 5.87 | 6.77 | 6.24 | 5.39 | 4.00 | 1.98 | 0.45 |
| 1706 | 3H | Q12 | Q12 | 2.62 | 3 | 87.3 |  | 2.62 | 2.91 | 2.77 | 2.51 | 1.96 | 1.15 | 0.58 |
| SAMs | 1H | Q11 | Q13 |  | 3 |  |  |  |  |  |  |  |  |  |
| 1706 | 3H | Q13 | Q14 | 3.24 | 6 | 54.0 |  | 3.24 | 4.33 | 3.32 | 2.40 | 1.54 | 0.73 | 0.28 |
| 1706 | 3H | Q14 | Q15 | 5.03 | 8 | 62.9 |  | 5.03 | 7.28 | 5.22 | 3.21 | 1.46 | 0.53 | 0.10 |
| SAMs | 2H | Q16 | Q16 |  | 5 |  |  |  |  |  |  |  |  |  |
| 1706 | 3H | Q16 | Q17 | 1.18 | 3 | 39.3 |  | 1.18 | 2.00 | 1.02 | 0.54 | 0.21 | 0.05 | 0.00 |
| 1706 | 3H | Q17 | Q18 | 3.02 | 6 | 50.3 |  | 3.02 | 4.65 | 3.01 | 1.64 | 0.62 | 0.21 | 0.04 |
| 1706 | 3H | Q18 | Q19 | 1.76 | 4 | 44.0 |  | 1.76 | 2.79 | 1.66 | 0.90 | 0.42 | 0.21 | 0.09 |
| 1706 | 3H | Q19 | Q20 | 2.45 | 6 | 40.8 |  | 2.45 | 4.64 | 2.00 | 0.46 | 0.11 | 0.01 | 0.00 |
| 1706 | 3H | Q21 | Q21 | 1.68 | 4 | 42.0 |  | 1.68 | 2.87 | 1.60 | 0.60 | 0.11 | 0.02 | 0.00 |
| 1706 | 3H | Q22 | Q22 | 1.44 | 5 | 28.8 |  | 1.44 | 2.76 | 1.00 | 0.39 | 0.12 | 0.03 | 0.00 |
| Spec pprs | 2H | Q22 | Q23 |  | 5 |  |  |  |  |  |  |  |  |  |
|  |  |  |  | **52.49** | **83** | **63.2** |  | **52.49** | **70.58** | **54.12** | **39.58** | **25.28** | **12.33** | **4.30** |

**Problem-solving questions: 2, 14, 21, 23**

**Reasoning questions: 4, 9, 11, 15, 19, 20, 22**

| Q | **Working** | **Answer** | **Mark** | **Notes** |
| --- | --- | --- | --- | --- |
| 1 |  | *x*² + 7*x* − 3*x* − 21 |  |  | M1 | for 3 correct terms **or** 4 correct terms ignoring signs **or** *x*² + 4*x* + c **or** .... + 4*x* 21 |
|  |  |  | *x*² + 4*x* 21 | 2 | A1 |  |
|  |  |  |  |  |  | **Total 2 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question** | **Working** | **Answer** | **Mark** | **AO** | **Notes** |
| **2** |  | × (10 + 14) × 9 oe (= 108) |  |  | AO2 | M1 | for area of cross section |
|  |  | ‘108’ × 6 (=648) |  |  |  | M1 | (dep on previous M1) for volume of prism |
|  |  | ‘648’ × 0.7 |  |  |  | M1 | (independent) |
|  |  |  | 453.6 | 4 |  | A1 | accept 454 |

| 3 | (a) |  | 3 < *L* ≤ 4 | 1 | B1 | Accept 3 4 |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | Eg 0.5×4 + 1.5×5 + 2.5×11 + 3.5×14 + 4.5×6 or 2 + 7.5 + 27.5 + 49 + 27 or 113 |  |  | M2 | *f* × *d* for at least 4 products with correct mid- interval values **and** intention to add.If not M2 then award M1 for *d* used consistently for at least 4 products within interval (including end points) **and** intention to add **or** for at least 4 correct products with correct mid-interval values with no intention to add |
|  |  | (0.5 × 4 + 1.5 × 5 + 2.5 × 11 + 3.5 × 14 + 4.5 × 6) ÷ 40**or** 113 ÷ 40 |  |  | M1 | dep on M1 (ft their products)NB: accept their 40 if addition of frequencies is shown  |
|  |  |  | 2.8 | 4 | A1 | Allow 2.82, 2.83 or 2.825  |
|  |  |  |  |  |  | **Total 5 marks** |

| 4 |  | 0.3 + *x* + 3*x* = 1 |  |  | M1 | oe, e.g. 4*x* = 0.7 | M1 for (20 – “6”) ÷ 4 (=3.5) |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | (1 – 0.3) ÷ 4 or 0.175 or(1 – 0.3) × 0.75 |  |  | M1 | complete method to find *x* or 3*x* | M1 for   |
|  |  |  | 0.525  | 3 | A1 | oe, e.g.  , 52.5% (accept 0.53 from correct working) | A1 for 0.525 oe |
|  |  |  |  |  |  | **Total 3 marks** |

| 5 |  | cos22 = $\frac{14.9}{AC}$or oroe |  |  | M1 |  | M1 for *BC* = 14.9 × tan22 oe (= 6.019 – 6.02)**AND** (*AC*2 = ) 14.92 + 6.019…2 |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | (*AC* = ) or( × sin 90) |  |  | M1 |  | M1 for (*AC* ) =   |
|  |  |  | 16.1 | 3 | A1 | Accept 16.07 − 16.1 |
|  |  |  |  |  |  | **Total 3 marks** |

| 6 | (a) | 668.8 640 or 28.8 |  |  | M1 |  | M2 for  **or** 1.045 **or** 104.5  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | "28.8" ÷ 640 (×100) or 0.045 |  |  | M1 | dep |
|  |  |  | 4.5 | 3 | A1 |  |  |
|  | (b) | oe oroe |  |  | M2 | for a complete methodIf not M2 then award M1 for (=7.04) **or** 0.95*x* = 668.8 oe |
|  |  |  | 704 | 3 | A1 |  |
|  |  |  |  |  |  | **Total 6 marks** |

| 7 |  | 96 ÷ 3 (= 32) |  | 3 | M1 |  | M2 for   |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 9 × ‘32’(=288) or 4 × ‘32’(=128) or (9 − 4) × ‘32’ |  |  | M1 | dep |
|  | 160 |  | A1 |  |
|  |  |  |  |  |  | **Total 3 marks** |

| 8 |  | Arc centre *Q* cutting *QP* and *QR* at *A* and *B* with *AQ* = *BQ* and arcs with same radius centre *A* and *B* intersecting in guidelines |  |  | M1 | for a relevant pair of intersecting arcs within guidelines |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Correct angle bisector | 2 | A1 | dep on M1SC: B1 for line within guidelines  |
|  |  |  |  |  |  | **Total 2 marks** |

| 9 | Eg 10*x* + 35*y* = 155 10*x* 6*y* = 32 |  6*x* + 21*y* = 93**+** 35*x* 21*y* = 112 |  |  | M1 | for coefficient of *x* or *y* the same **and** correct operation to eliminate selected variable (condone any one arithmetic error in multiplication) **or**for correct rearrangement of one equation followed by correct substitution in the other. |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | A1 | cao (dep on M1) |
|  |  |  |  |  | M1 | (dep on 1st M1) for substituting their found value into one of the equations **or**correct method of elimination to find the second variable (as for first M1) |
|  |  |  | *x* = 5, *y* = 3 | 4 | A1 | caoAward 4 marks for correct values if at least first M1 scored |
|  |  |  |  |  | **Total 4 marks** |

| **10** |  | 7500 × 0.04 or 300 or 7500 × 1.04 or 7800 or 7500 × $1.04^{n}$ (*n* > 1 )Eg 7500 +⨯7500 + ⨯(7500 + “300”) +⨯(7500 + “300” + “312”) or7500 + “300” + “312” + “324.48” | 8436.48 | 3 | M1M1  | For interest for first year or for 7500 × 0.04 × 3 oe or 900 or for 7500 + 7500 × 0.04 × 3 oe or an answer of 8400For a complete method | M2 for 7500⨯ 1.043 oe |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A1 | Accept answers in the range 8436 – 8437NB: Answer in the range 936 -937 gets M2A0 |
|  |  |  |  |  |  | **Total 3 marks** |

| 11 | (a) |   |  |  | M1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  oe | 2 | A1 | for  oe E.g. , 0.31(1…), 31(.1…)% |
|  | (b) |  | 4, 32, 62, 78, 86, 90  | 1 | B1 | cao |
|  | (c) | (30, 4) (40, 32) (50, 62) (60, 78) (70, 86) (80, 90) |  |  | M1 | (ft from sensible table i.e. clear attempt at addition)for at least 4 points plotted correctly at end of interval  **or** for all 6 points plotted consistently within each interval in the **freq table** at the correct height(e.g. used values of 25, 35, 45 etc on age axis) |
|  |  |  | correct cf graph | 2 | A1 | accept curve or line segments accept curve that is not joined to (20,0) |
|  | (d) | E.g. reading from graph at *t* = 65**or** reading of 82 – 84 **or** mark on cf axis from using *t* = 65 |  |  | M1 | for evidence of using graph at *t* = 65ft from a cumulative frequency graph provided method is shown |
|  |  |  | 6 – 8  | 2 | A1 | dep on a cf graph in part (c)ft from a cumulative frequency graph provided method is shown |
|  |  |  |  |  |  | **Total 7 marks** |

| 12 | (a) |  |  | 1 | B1 | cao |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) |  |  |  | M1 | for 3250000000 oe (e.g. 325 × 107) **or** 3.25 × 105 - -4 oe **or** where *n* is an integer |
|  |  |  |  | 2 | A1 |  |
|  |  |  |  |  |  | **Total 3 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question** | **Working** | **Answer** | **Mark** | **AO** | **Notes** |
| **13** |  | e.g. (*x*2 + 5*x* – 3*x* – 15)(*x* + 3) **or** |  |  | AO1 | M1 | expansion of any two of the three brackets – at least 3correct terms |
|  |  | (*x*2 + 2*x* – 15)(*x* + 3) **or** |  |  |  |  |  |
|  |  | (*x* – 5)(*x*2 + 3*x* – 3*x* – 9) **or** |  |  |  |  |  |
|  |  | (*x* – 5)(*x*2 – 9) |  |  |  |  |  |
|  |  | E.g. *x*3 + 3*x*2 + 2*x*2 + 6*x* – 15*x* – 45 **or** |  |  |  | M1 | (dep) ft for at least 3 correct terms in second expansion |
|  |  | *x*3 + 5*x*2 – 9*x* − 45 |  |  |  |  |  |
|  |  |  | *x*3 + 5*x*2 – 9*x* − 45 | 3 |  | A1 |  |

| 14 | (a) | E.g. ororor **or**  |  |  | M1 | for a correct scale factor **or** a correct equation (may be in ratio form e.g. 12 : 8 = 9 : *d*)accept 0.66… or 1.33… rounded or truncated to 2 or more decimal places  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 6 | 2 | A1 |  |
|  | (b) |  oe or   |  |  | M1 | for a correct scale factor or |
|  |  |  | 540 | 2 | A1 |  |
|  | (c) |  |  |  | M1 | for  or  or oe |
|  |  |  | oe | 2 | A1 | for oe e.g.  |
|  |  |  |  |  |  | **Total 6 marks** |

| 15 | (a) |  | *x*4 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | 6 + 4*y* = 3(5 2*y*)  |  |  | M1 | for removing fraction |
|  |  | 6 + 4*y* = 15 6*y*  |  |  | M1 | for correct expansion of bracket in a correct equation |
|  |  | 4*y* + 6*y* = 15 6 **or** 10*y* = 9 |  |  | M1 | for a correct equation with *y* terms isolated on one side ft their equation if first M1 awarded |
|  |  |  |  oe | 4 | A1 | dep on at least M2SC: B2 for an answer of *y* = 1.5 oe with working shown **or**  *y* = −0.1oe with working shown |
|  | (c) | *g* g*h =* 3*h* + 1 **or** −1 – 3*h* = *gh* − *g* |  |  | M1 | for a correct equation with terms in *g* isolated on one side of the equation |
|  |  | *g*(1 *h*) = 3*h* + 1 **or** −1 – 3*h* = *g*(*h* – 1) |  |  | M1 | for taking *g* out as a common factor(must be two terms in *g* but terms may not be correct (terms in *g* may not be isolated)) |
|  |  |  | oe | 3 | A1 | for oe e.g.  |
|  |  |  |  |  |  | **Total 8 marks** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question** | **Working** | **Answer** | **Mark** | **AO** | **Notes** |
| **16** | **a** |  or   |  |  | AO1 | M1 |  |
|  |  | 24 =  oe or (*k* = 375) |  |  |  | M1 | implies first M1 |
|  |  |  |  | 3 |  | A1 | accept with *k* = 375 stated elsewhere in question |
|  | **b** |  oe or   |  |  | AO1 | M1 |  |
|  |  |  | 15 | 2 |  | A1 |  |

| 17 |  | E.g. + 5*e* 3*e* *e*² **or**30 + 2*e* *e*²  |  |  | M1 | for rational terms correct ( *e*² ) **or** irrational terms correct (5*e* 3*e*) NB:  may be fully or partially simplified |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  *e*² = −6 oe **or** rational terms correct **and** *e* = 6 **or**5 *e*  3*e* = *f* oe **or**5*e*  *3e* = *f* oe  |  |  | M1 | dep on M1 |
|  |  |  | *e* = 6*f* = 12 | 3 | A1 |   |
|  |  |  |  |  |  | **Total 3 marks** |

| 18 | (a)(i) |  | a + b oe | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (a)(ii) |  | a + 0.5b | 1 | B1 | for **a** + 0.5**b** oeft from (i) |
|  | (a)(iii) |  | 0.5a + 0.5b | 1 | B1 | for 0.5**a** + 0.5**b** oe (may not be simplified)ft from (i) |
|  | (b) |  **or** (7, 3) seen as coordinates for *R*$\vec{PV}$ = 1.5 +  **or**  +  **or**   **or** (*X*) = (3 + 1.5 × 4, 1 + 1.5 × 2) **or** (3 + 6, 1 + 3) **or** (9, 4) **or**  |  |  | M1 |  |
|  |  | $\vec{OV}$ =  +  **or**   **or** *V* ("9"5 , "4" + 4) |  |  | M1 | dep |
|  |  |  | (4, 8) | 3 | A1 | SC: If M0 then awardB1 for (4, *y*) or (*x*, 8) |
|  |  |  |  |  |  | **Total 6 marks** |

| 19 | (a) |  | 1, 4, 5, 40 | 2 | B2 | for all four correct (B1 for 2 or 3 correct) |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b)(i) |  | 1 | 1 | B1 | ft from their Venn diagram |
|  | (b)(ii) |  | 45 | 1 | B1 | ft from their Venn diagram |
|  |  |  |  |  |  | **Total 4 marks** |

| 20 | (a) | *x*(*y* 3) = 4 | *y*(*x* 3) = 4 |  |  | M1 | for *x*(*y* 3) = 4 **or** *y*(*x* 3) = 4 |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | *xy* = 4 + 3*x* **or** | *xy* = 4 + 3*y* **or** |  |  | M1 | (implies the first M1) |
|  |  |  |  |  oe | 3 | A1 | for  oe e.g.  |

| 20 | (b) | E.g. **or** 4 =  **or**  |   |  | M1 | for a correct expression for fg(*a*)  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | E.g. 4*a* = *a* 23*a* or7*a* = |  |  | M1 | for a correct equation where the fraction has been removed. |
|  |  |  |  oe | 3 | A1 | dep on M1Accept −0.333(333...) rounded or truncated to at least 3SFCondone the use of *x* rather than *a* |
|  |  |  |  |  |  | **Total 6 marks** |

| 21 |  |  |  |  | B1 | for identifying the correct angle on the diagram(may be implied by a correct trig statement) |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | (*MC*=)  or  or 18.6(8154....)(*VC*=)  or  or 19.9(499..) |  |  | M1 | for a correct method to find *MC* or *VC*Accept 18.6(8154....) rounded or truncated to at least 3sf. Accept 19.9(4993..) rounded or truncated to at least 3 sf |
|  |  |  or  or |  |  | M1 | dep M1 for a complete method to find angle *VCM* (could be use of sine or cosine rule)e.g. 90 − |
|  |  |  | 20.5 | 4 | A1 | accept 20.5 − 20.62 |
|  |  |  |  |  |  | **Total 4 marks** |

| 22 |  |  E.g.   |  |  | M1 | *x*² 2*x* 48 correctly factorisedNB : May be seen at a later stage$\frac{ – 1}{ 2(8 – x) }$ |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | E.g. or |  |  | M1 | for a correct common denominator with numerators correct This may be a single fraction or two fractions; denominators may be expanded – if so, must be correct. |
|  |  |  |  |  | M1 | for a correct single fraction with brackets in numerator removed correctly; denominators may be expanded – if so, must be correct. |
|  |  |  |  |  | M1 | for a correct single fraction with the numerator simplified; denominators may expanded – if so, must be correct. |
|  |  |  |   | 5 | A1 | dep on at least M2for or or $\frac{ –1}{16 –2x }$ or  |
|  |  |  |  |  |  | **Total 5 marks** |

| 22 |  | *a* + 2*d* = 19 |  | 5 | M1 | A formula for term 3 |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | (2*a* + 9*d*) = 290 oe |  |  | M1 |  A formula for the sum of the first 10 terms |
|  |  | Eg 10*a* + 45*d* = 290 10*a* + 20*d* = 190 Or 5(2(19 – 2*d*) + 9*d*) = 290, *a* = 11, *d* = 4 |  |  | M1 | A correct method to find *a* or *d*  |
|  |  | 10th term = 11 + 9 × 4or 290 – 4.5(2 × 11 + 8 × 4) | 47 |  | M1A1 | A correct method to find the 10th term. |
|  |  |  |  |  |  | **Total 5 marks** |